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AUTHOR Robinson, Clyde C.
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ABSTRACT

Divergent thinking ability of 30 preschool children 4 years of age was assessed with a multiple-use task procedure that was modified to allow the subjects to demonstrate and verbalize their responses. Findings indicated that fluency scores were greater for demonstrated responses than for verbalized responses. The correlation between verbal fluency and demonstrated fluency was negative, and the total fluency score was highly correlated with the demonstrated fluency component. Findings on verbal and demonstrative divergent thinking components of the study were compared to the results of a previous study which used a standard multiple-use task procedure with kindergarten children. It is concluded that tentative findings support the claim that preschool children are not as verbally sophisticated as older children. Therefore, their divergent thinking ability can be more accurately assessed when a demonstration component is included in the experimental task. (Author/RH)

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Measuring Divergent Thinking Ability of Preschool Children Using Demonstrative as Well as Verbalized Responses

Clyde C. Robinson, Ph.D.

Director, Child/Parent Center
Division of Education
Brigham Young University - Hawaii Campus
Laie, Hawaii

Running Head: DIVERGENT THINKING ABILITY

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Abstract

Divergent thinking ability was assessed with 30 4-year-old preschool children using a multiple use task procedure that was modified to allow the subjects to both demonstrate and verbalize their responses. Fluency scores were greater for demonstrated responses than for verbalized responses, the correlation between verbal fluency and demonstated fluency was negatively related, and the total fluency score was highly correlated with the demonstrated fluency component. The verbal and demonstative divergent thinking components of this study were compared to the results of a previous study which used a standard multiple use task procedure with kindergarten-age subjects. The tenative findings lends support to the claim that preschool-age children are not as verbally sophisticated as older children and as such their divergent thinking ability could be more accurately assessed if a demonstrative component is included in the task.

Measuring Divergent Thinking Ability of Preschool Children Using Demonstrative as Well as Verbalized Responses

Many instruments are available to early childhood educators and researchers which have been designed to measure some part of the child's cognitive domain. Most of the instruments used, however, assess the child's abilities and knowledge in some aspect of convergent thinking. Convergent thinking is typically the thinking required by problems for which there is a single correct answer, which the child either knows or not. Other cognitive domain abilities include those involved with divergent thinking. Tasks requiring divergent thinking may involve a specification of the kind of product that is required, but not of the way in which it is to be achieved. These tasks typically have many possible answers, some of which are better than others, rather than one correct answer. Thus, divergent thinking tasks leave room for the demonstration of originalilty, imagination, and flexibility of thinking.

Interest in divergent thinking has been high since Guilford's (1956) identification of these abilities as being most relevant for creativity. Divergent thinking is considered to be relevant for, rather than identical with, creativity. That is, acts which are viewed as "creative" are generally those that produce a novel or imaginative solution to a problem of some scientific, social, or artistic importance. The literature abounds with studies using divergent thinking ability as an index

to creativity (see Kogan, 1983, pp. 635-643). More specifically of interest to early childhood educators, divergent thinking tasks have been used by Dansky (1980), Dansky and Silverman (1973), and Pepler and Ross (1981) to demonstrate a link between creativity and young children's play. Also, studies by Getzels and Jackson (1962), Torrance (1963), Wallach and Kogan (1965), and others have suggested links between the cognitive aspects of divergent thinking abilities and desirable personality characteristics in children. For example, children high in divergent thinking have been seen as more sensitive, more open to experience, and more willing to take chances in interpersonal as well as cognitive contexts.

Special problems arise, however, when divergent thinking in preschool-age children is assessed. Most of the instruments used with adults and older children to measure divergent thinking rely heavily upon verbal processes. Typically, the child or adult is asked to provide all the possible consequences of some improbable event, all the ways in which two objects may be seen as being alike, all the ways he/she can think of to use a common object (multiple use task), and so on. Even when the stimulus materials are visual, as they are in the frequently used multiple use tasks, the response is likely to require that the young child have available a large and relatively sophisticated vocabulary with which to describe the various uses. Older children and adults are more likely to have a sufficient vocabulary base in

order to exhibit their divergent ability, however, for preschool and kindergarten children, tasks which rely heavily on verbal processes cannot be expected to show the same relative independence of vocabulary, information, and general reasoning ability.

Since there is reasonable doubt about the independence between young children's vocabulary and their divergent thinking abilities, the purpose of this study is to determine if it is feasible to measure divergent thinking in preschool-age children using a multiple use task which does not have a total reliance upon verbal abilities. This was accomplished by recording the children's nonverbal or demonstrative responses in addition to their verbal responses. The author is not aware of any normative data reported in the literature assessing divergent thinking using a demonstrative component, in conjunction with, a verbal component. Pepler and Ross (1981), using a multiple use task, did have a demonstrative as well as a verbal procedure with preschool-age children, however, they only reported the results of the verbal component.

Method

Subjects

The subjects were 30 children of middle- and upper-middle-class background, all attending a university related preschool. There were 16 girls and 14 boys ranging in age from 51 to 64 months ($\underline{x}$ = 57.3 months). Twenty nine subjects were white and

one subject was Oriental-American.

Procedure

All subjects were seen individually by a 26-year-old white female graduate student who was previously a head teacher to most of the subjects. Prior to administering the multiple use test, the experimenter visited the preschool classroom twice to renew her acquaintance with the subjects. The experimenter asked each subject if they would like to play a game with her. Two children refused to participate in the task and were dropped from the study. The experimenter sat along side each subject at a small table in an adjoining preschool classroom. The multiple use task adapted from Pepler and Ross (1981) was used. The materials used in the task were four sets of objects common to the subjects (three small block vehicles, three wooden people, three ice cube trays, and three plastic clothes hangers). Each object set of three was presented to the subject one set at a time with the order of presentation systematically varied between subjects. After showing the subject a single set of objects, the experimenter said ... "You can use these in lots of different ways. I would like you to tell me and show me all the things that you can do with them and all the ways you can play with them." The subjects were then allowed to touch and manipulate the objects. Allowing the subjects to manipulate the objects departs from the typical multiple use procedure which usually allows the subjects to only view the objects. The experimenter

recorded the subject's verbal responses on a hidden tape recorder and inscribed the demonstrated responses on a small note pad. The tasks were scored for fluency (number of responses; both verbal and demonstrative) and uniqueness (number of nonrepeated responses; both verbal and demonstrative). Interrater agreements calculated between two raters for fluency was 97.4% and for uniqueness was 93.2%.

Results

As expected for preschool-age children when given the opportunity of expressing themselves both verbally and demonstratively on a multiple use task, the demonstrative fluency response mean of 13.13 was significantly higher than the verbal fluency response mean of 6.87 (t = 2.67, p = 0.012). This finding supports the argument that preschool-age children may not be as verbally sophisticated as older children and as such are able to express their ideas more fluently through demonstration than through verbalization. Correlation coefficients were calculated between the subjects' verbal, demonstrative, and total (verbal + fluency) scores in order to determine the relationships between these components. The correlation between the subjects' verbal fluency and demonstrative fluency scores showed a negative and moderately low relationship (r = -.35, p = .058). The correlation between the verbal fluency componant and the total fluency score was small (r = .28, p = .135) while the correlation between the demonstrative fluency componant and total fluency

score was quite high (r = .802, p < .0001). If futher evidence is found to support these findings, a more accurate assessment of preschool-age childrens' divergent thinking abilities using a multiple use task would then be obtained if early childhood educators and researchers drew from the child's demonstrative knowledge domain rather than merely relying upon a less sophisticated verbal knowledge domain.

It would be helpful to compare the demonstrative and verbal fluency means of this study with those of other studies using a multiple use task with preschool-age children to corroborate these results. However, the author is not aware of any study which has published the verbal fluency means for this age group. Ward (1968) did report the uniqueness and fluency means of a multiple use task for kindergarten-age children using four different test items (e.g., newspaper, knife, cup, and coat hanger). These results are included in Table 1.

Insert Table 1 about here

Table 1 compares the multiple use task means for verbal uniqueness and verbal fluency of Ward's study with kindergarten children and the present study's verbal and demonstrative fluency means and uniqueness means. The figures in Table 1 indicate that the kindergarten boys' verbal fluency mean is significantly higher than the verbal fluency mean for the

preschool boys (t = 8.74, p < .01) and the kindergarten girls' verbal fluency mean is significantly larger than the verbal fluency mean of the preschool girls (t = 6.11, p <.01). This is not supprising since the preschool children were given the choice to demonstrate as well as respond verbally. It is not known from the present study if the preschool children's lower verbal fluency scores are due to a limited vocabulary base or due to a preference in demonstrating their responses. The results in Table 1 do show how the demonstrative domain can have quite an impact upon the preschool child's total creativity score (fluency + uniqueness) if included in the measurement. With the demonstrative component, the total creativity measure for the preschool boys is approximately 40% greater than it is for the kindergarten boys without a demonstrative component while the total creativity measure for preschool girls with a demonstrative component is approximately 70% greater than it is for the kindergarten girls without a demonstrative component. An additional limitation of this study is that it is not known from this data how including the domonstrative responses effect or alter the individual subject's divergent thinking score relative to others. It is possible that a subject may have a low divergent thinking score when measured using only verbal responses and may have a high divergent thinking score if demonstrated responses are included. There are important test reliability and construct validity issues that need to be addressed with futher research.

In sum, this study shows that measuring young children's demonstrative responses to a multiple use task is a relatively simple procedure. More crucially, the results show that preschool-age children are more fluent when demonstrating (as compared to verbalizing) their responses when given the opportunity and that the combined fluency score (demonstrative and verbal) is significantly related to the demonstrative component. The implications for early childhood educators and researchers interested in assessing young children's cognitive skills, abilities, and knowledge would be to choose and/or develop instruments which do not have as a requirement soley the availability of a large and relatively sophisticated vocabulary. Further work addressing this issue and establishing a reliability for demonstrative knowledge and skills of young children may prove to be very beneficial and should be encouraged.

Table 1

Multiple Use Test Means Comparing Ward's (1968) Study with Present Study

	Verbal Unique	Verbal Fluent	Demo. Unique	Demo. Fluent	Total
Males					
5-yrs-old*					
M	6.15	15.24	----	---	21.39
SD	(8.89)	(10.66)			
4-yrs-old#					
M	3.79	6.43	5.43	15.07	30.72
SD	(2.61)	(5.43)	(2.82)	(10.92)	
Females					
5-yrs-old*					
M	4.26	11.83	----	----	16.09
SD	(3.62)	(4.62)			
4-yrs-old#					
M	3.88	7.25	5.13	11.44	27.70
SD	(3.22)	(6.49)	(2.53)	(8.03)	

* Ward's (1968) study with kindergarten children

Present study with preschool children

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